

1 406 636

- (21) Application No. 50899/72 (22) Filed 3 Nov. 1972 (19)  
 (31) Convention Application No. 7 141 940  
 (32) Filed 6 Nov. 1971 in  
 (33) Germany (DT)  
 (44) Complete Specification published 17 Sept. 1975  
 (51) INT. CL.<sup>2</sup> B41F 31/00  
 (52) Index at acceptance  
 B6C 10B3B  
 (72) Inventor GERHARD ROTH



(54) IMMERSION ROLLER FOR AN INKING MECHANISM OF A  
 ROTARY PRINTING MACHINE

(71) We, MASCHINENFABRIK AUGS-  
 BURG-NÜRNBERG AKTIENGESellschaft, a  
 German company, of Stadtbachstrasse 1,  
 8900 Augsburg, Germany, do hereby declare  
 the invention, for which we pray that a pat-  
 ent may be granted to us, and the method  
 by which it is to be performed, to be parti-  
 cularly described in and by the following  
 statement:—

This invention relates to an immersion  
 roller for an inking mechanism of a rotary  
 printing machine, the roller having grooves  
 in its generated surface and support faces or  
 lands between the grooves.

Immersion rollers having a smooth sur-  
 face do not afford uniform ink transfer,  
 when viscous and cold ink is used, even with  
 high application pressure against a doctor  
 roller, because a uniform rotary movement  
 is not achieved.

It is an object of the invention to make  
 possible a substantially uniform rotational  
 movement of an immersion roller driven by  
 the doctor roller by frictional engagement,  
 thereby permitting the achievement of uni-  
 form ink conveying with any suitable ink  
 consistency, whilst at the same time afford-  
 ing simple manufacture.

According to the present invention, there  
 is provided an immersion roller for an ink-  
 ing mechanism of a rotary printing machine,  
 the immersion roller having grooves in its  
 generated surface, the grooves being inclined  
 to the axial direction and arranged so that  
 a number of grooves intersect with other  
 grooves, and lands between the grooves  
 which are adapted for contacting another  
 roller the rotary axis of which is parallel to  
 the immersion roller, the lands being shaped  
 and arranged in such a manner that the sum  
 of the lengths of the lands along a contact  
 line parallel to the axis of the immersion  
 roller is approximately equal for all such  
 contact lines around the periphery of the  
 immersion roller. Thus, the sum of the  
 lengths of the lines of contact of the sup-  
 porting faces or lands of the immersion

roller with an adjacent doctor roller, the  
 axis of which is parallel to the axis of the  
 immersion roller, is substantially equal in  
 every relative rotary position of the immer-  
 sion and the doctor roller.

Due to this arrangement, the contact line  
 of the doctor roller with the immersion  
 roller never extends along zones in which  
 simultaneously there is only little contact  
 available and, therefore, in which driving of  
 the immersion roller is prevented or im-  
 paired by lack of friction, but contact is  
 effective in every position with respect both  
 to small and also large zones of the support-  
 ing faces. In the case where the grooves are  
 helically arranged ink delivery takes place  
 in uniform helical configuration.

Preferably, the support lands of the im-  
 mersion roller, are each constituted by an  
 individual diamond-shaped, rhombic face,  
 and the faces are arranged in aligned and  
 spaced relationship, so that a straight line  
 connecting all the diagonals of the rhombi  
 of a longitudinal row extends at an angle of  
 at least 5° relative to an axis-parallel gene-  
 ratrix. Such a design makes possible, in  
 addition to good and rapid cleaning on  
 changing the ink colour, also inexpensive  
 manufacture due to simple machining of the  
 recesses.

The invention may be carried into prac-  
 tice in a number of ways but one specific  
 embodiment will now be described, by way  
 of example only, with reference to the  
 accompanying drawings, in which:—

Figure 1 shows a thin-layer inking me-  
 chanism of a rotary printing machine, in dia-  
 grammatic form, and

Figure 2 shows an elevation, partly sec-  
 tioned, of an immersion roller according to  
 the invention.

The thin-layer (film) inking mechanism  
 illustrated in Figure 1 consists of an ink  
 fountain 1 having an immersion roller 3  
 which rotates in the printing ink 2 and  
 which is driven by frictional contact with a  
 driven doctor roller 4, thereby taking up ink

[Price 33p]

out of the ink fountain on to the generated surface of the immersion roller, and transferring the ink to the doctor roller 4. Slightly spaced away from the doctor roller 4, but in contact with the ink layer disposed thereon, there is arranged a thin-layer (film) roller 5 having a metal surface and from which the ink is transferred to a rubber-coated ink transfer roller 6 and from the latter to an axially reciprocated distribution roller 7 having a metal surface. The drive of the doctor roller 4 is effected, in known manner, continuously or batch-wise.

In order to ensure, at any time, the driving of the immersion roller 3, which is effected by frictional contact with the doctor roller 4, the generated surface of the immersion roller 3 is formed with two series of recesses or grooves 9 arranged crosswise relative to each other and in such a manner that the length of a contact line 8 of the doctor roller 4 with support faces or lands 10, which project radially above the grooves 9, is substantially equal in any relative rotary position of the immersion and doctor rollers. In order to make this possible, the support or contact faces 10, which are formed as lands by virtue of the intersecting series of grooves 9 arranged crosswise relative to each other, of one longitudinal row must not be arranged symmetrically along on axis-parallel generatrix, but in such a way that a straight line 12 connecting all the rhombi of the diamond-shaped contact lands 10 in the longitudinal direction extends at an acute angle  $\alpha$ , which is preferably at least  $5^\circ$  relatively to an axis-parallel generatrix.

This is achieved by helical milling of the groove-like recesses 9 in two series of screw-thread-like multistart grooves, the two series of grooves extending respectively in two intersecting directions. One series of grooves has a different pitch from that of the other. In the case of an immersion roller of diameter of approximately 93 mm, a series of grooves corresponding to a right-hand multistart screwthread having a lead of 180 mm with 20 as the number of starts (thus having a pitch = 9 mm), in combination with a series of grooves corresponding to a left-hand multi-start screwthread having a lead of 224 mm with 28 as the number of starts (thus having a pitch = 8 mm), has been found to be especially advantageous.

The pitches and preferably also the number of starts of the two series of grooves should be different in order to achieve a staggered arrangement of support surfaces relative to an axis-parallel generatrix, which affords an equal length of the contact line and therewith uniform friction of the doctor roller 4 with the contact lands 10 on the immersion roller.

The immersion roller 3 may, as is shown in the drawing, consist of a thin metal tube

13 the ends of which are sealed by inserted cover discs 15 having journals, the metal tube having a rubber covering 14 formed with the grooves 9 and the contact lands 10.

#### WHAT WE CLAIM IS:—

1. An immersion roller for an inking mechanism of a rotary printing machine, the immersion roller having grooves in its generated surface, the grooves being inclined to the axial direction and arranged so that a number of grooves intersect with other grooves, the lands between the grooves which are adapted for contacting another roller the rotary axis of which is parallel to the immersion roller, the lands being shaped and arranged in such a manner that the sum of the lengths of the lands along a contact line parallel to the axis of the immersion roller is approximately equal for all such contact lines around the periphery of the immersion roller.
2. An immersion roller as claimed in claim 1, in which each land of the immersion roller is constituted by a diamond-shaped, rhombic face, the faces being arranged in aligned and spaced relationship, a straight line connecting all the diagonals of the rhombi of a longitudinal row extending at an angle of at least  $5^\circ$  relative to an axis-parallel generatrix.
3. An immersion roller as claimed in claim 1 or claim 2 in which the grooves are formed in the generated surface as two series of helical grooves, the grooves of one series intersecting the grooves of the other series.
4. An immersion roller as claimed in claim 3, in which each series of helical grooves comprises a number of parallel grooves, similar to a multistart screwthread, one series of grooves corresponding to a left-handed screwthread and the other series corresponding to a right-handed screwthread, one series of grooves having a different number of starts and different pitch from those of the other series of grooves.
5. An immersion roller as claimed in claim 4, in which the pitch of the right-handed grooves is larger than the pitch of the left-handed grooves and in which the number of starts of the series of right-handed grooves is smaller than that of the series of left-handed grooves.
6. An immersion roller substantially as specifically described herein with reference to the accompanying drawings.
7. A rotary printing machine having an inking mechanism including an immersion roller as claimed in any one of the preceding claims in which the immersion roller is arranged to be driven by frictional contact with a driven roller.

BEST AVAILABLE COPY

HASELTINE LAKE & CO.,  
Chartered Patent Agents,  
28 Southampton Buildings,  
Chancery Lane, London WC2A 1AT,

and Temple Gate House, Temple Gate,  
Bristol BS1 6PT,  
and 9 Park Square,  
Leeds LS1 2LH.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1975.  
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY,  
from which copies may be obtained.

BEST AVAILABLE COPY

1406636

COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of  
the Original on a reduced scale

Fig.1

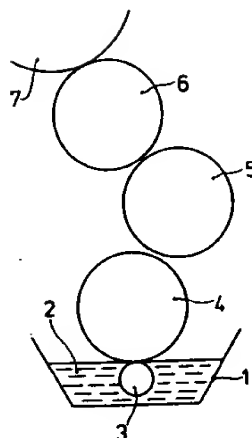
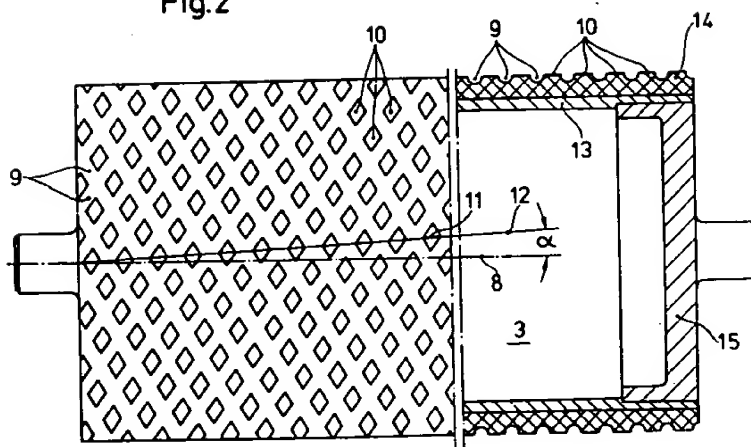


Fig.2



DOCKET NO: A-2528

SERIAL NO: 09/658,712

APPLICANT: Heiler et al.

LERNER AND GREENBERG P.A.

P.O. BOX 2480

HOLLYWOOD, FLORIDA 33022

TEL. (954) 925-1100

BEST AVAILABLE